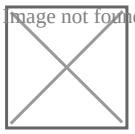
Noisy Garage

- **Diagnosing Noisy Garage Door Operation**
  Diagnosing Noisy Garage Door Operation **Fixing Doors That Ride Off Track** **Resolving Sensor Misalignment Errors** **Interpreting Opener LED Blink Codes** **Addressing Slow or Jerky Door Movement** **Eliminating Mid Travel Door Reversal** **Quieting Squeaky Rollers with Proper Lubrication** **Identifying Cable Fraying and Safety Risks** **Correcting Uneven Door Closing Gaps** **Resetting Remote Controls After Power Outage** **Detecting Spring Fatigue Before Failure Occurs** **Choosing When to Call a Professional for Repairs**
- **Setting Up Z Wave Connectivity for Your Garage Door**
  Setting Up Z Wave Connectivity for Your Garage Door **Linking Garage Doors to Apple HomeKit Scenes** **Voice Control Tips with Google Home Assistants** **Using Amazon Alexa Routines for Door Automation** **Security Considerations for Cloud Based Door Access** **Updating Firmware on Smart Garage Controllers** **Troubleshooting WiFi Signal Issues in the Garage** **Integrating Door Status into Home Security Dashboards** **Battery Backup Management for Connected Openers** **IFTTT Recipes to Automate Garage Door Functions** **Data Privacy Practices for Smart Garage Devices** **Future Trends in Connected Garage Door Technology**
- **About Us**

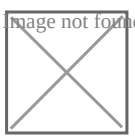
In the realm of precision engineering and advanced technology, sensors play a pivotal role in ensuring that systems operate within their intended parameters. However, one of the challenges that often arises in this field is sensor misalignment, which can lead to significant errors in data collection, interpretation, and system performance. Addressing and resolving these misalignments is crucial for maintaining accuracy and reliability across various applications, from automotive systems to aerospace navigation.

Sensor misalignment occurs when a sensors physical position deviates from its optimal placement relative to the object or environment it is supposed to monitor. This deviation might be due to manufacturing defects, installation errors, or even shifts during operation caused by vibrations or thermal expansion. The consequences of such misalignment are not trivial; they can result in skewed readings that misrepresent reality, leading to decisions based on flawed data.



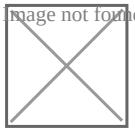
The first step in resolving sensor misalignment errors involves detection. In many high-stakes environments like aerospace or medical devices, regular calibration checks are standard practice. These checks involve comparing sensor outputs against known standards or benchmarks. If discrepancies exceed acceptable thresholds, its an indicator that something might be off with the alignment. Advanced diagnostic tools can also simulate conditions under which sensors should perform optimally, thereby highlighting any deviations.

Once misalignment is detected, the next phase is diagnosis-understanding the root cause. This might require a detailed examination of how the sensor was installed initially or if there have been changes in its environment since installation. For instance, in a vehicles tire pressure monitoring system (TPMS), temperature changes could cause slight movements in sensor placement if not securely fastened.



After diagnosis comes correction. The approach here can vary significantly based on the application:

- **Mechanical Adjustment:** In simpler setups like industrial machinery where sensors monitor speed or position, manual adjustment might suffice. Technicians could physically realign the sensor using precise tools like micrometers or laser alignment systems.



- **Software Compensation:** In more complex systems where physical access for adjustment might be impractical-such as inside jet engines-software solutions come into play. Algorithms can be developed to interpret slightly off-center data and correct for known biases introduced by misalignment.

- **Redundancy:** Some high-criticality applications employ multiple sensors for redundancy. If one sensor shows readings inconsistent with others (after accounting for normal variance), software can flag this for review or automatically adjust reliance on that particular sensors data until corrected.

- **Advanced Calibration Techniques:** Modern technology allows for dynamic recalibration where sensors adjust their own parameters through feedback loops based on real-time operational data.

Finally, prevention is as important as correction. Regular maintenance schedules that include checking for potential causes of misalignment (like wear and tear on mounting brackets) help ensure longevity of correct alignment. Moreover, designing systems with built-in flexibility to accommodate minor misalignments without loss of function can reduce the frequency and impact of these errors.

Educating technicians and engineers about the importance of sensor alignment cannot be overstated either. Training programs should emphasize precision during installation and highlight common pitfalls leading to misalignment issues over time.

In conclusion, resolving sensor misalignment errors is a multifaceted process involving detection through diligent calibration practices, diagnosis through understanding system dynamics, correction via mechanical or digital means, and prevention through design foresight and maintenance routines. By addressing these aspects comprehensively, industries reliant on accurate sensory input can maintain high standards of performance and safety, ensuring that their technological marvels continue to function as intended amidst real-world challenges.

Fixing Doors That Ride Off Track

About Lake County, Indiana

Not to be confused with Lake County, Illinois.

Lake County, Indiana

County

Former Lake County Courthouse in Crown Point, Indiana

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Former Lake County Courthouse
in Crown Point, Indiana

Official seal of Lake County, Indiana

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Seal

Location in the state of Indiana

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Location in the state of Indiana

Indiana's location in the U.S.

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Indiana's location in the U.S.

Coordinates: 41°25?N 87°22?WÃ¯Â»Â¿ / Ã¯Â»Â¿41.417°N 87.367°W

Country	Image not found or type unknown United States
State	Image not found or type unknown Indiana
Region	Northwest Indiana
Metro area	Chicago Metropolitan
Settled	October 1834[1]
Established	February 16, 1837[2]
Named after	Lake Michigan
County seat	Crown Point
Largest city	Hammond (population) Gary (total area)

Incorporated municipalities	**19 cities and towns** Cedar Lake (town) Crown Point (city) Dyer (town) East Chicago (city) Gary (city) Griffith (town) Hammond (city) Highland (town) Hobart (city) Lake Station (city) Lowell (town) Merrillville (town) Munster (town) New Chicago (town) Schererville (town) Schneider (town) St. John (town) Whiting (city) Winfield (town)
	Government [3]
• Type	County
• Body	Board of Commissioners
• Commissioner	Kyle W. Allen, Sr. (D, 1st)
• Commissioner	Jerry J. Tippy (R, 2nd)
• Commissioner	Michael C. Repay (D, 3rd)
• County Council	**Members** David Hamm (D, 1st) Clorius Lay (D, 2nd) Charlie Brown (D, 3rd) Pete Lindemulder (R, 4th) Christine Cid (D, 5th) Ted F. Bilski (D, 6th) Randy Niemeyer (R, 7th)
	Area
• County	626.5 sq mi (1,623 km^2)
• Land	498.9 sq mi (1,292 km^2)
• Water	127.6 sq mi (330 km^2)

• **Metro**	10,874 sq mi (28,160 km^2)
• **Rank**	12th largest county in Indiana
• **Region**	2,726 sq mi (7,060 km^2)
	Dimensions [4]
• **Length**	36 mi (58 km)
• **Width**	16 mi (26 km)
Elevation [5] ***(mean)***	663 ft (202 m)
Highest elevation [6]**—*NE Winfield Twp***	801 ft (244 m)
Lowest elevation [7]**—*at Lake Michigan***	585 ft (178 m)
	Population (2020)
• **County**	498,700
• **Estimate (2023)**	500,598 Image not found or type unknown
• **Rank**	2nd largest county in Indiana 131st largest county in U.S.[8]
• **Density**	800/sq mi (310/km^2)
• **Metro**	9,522,434
• **Region**	819,537
Time zone	UTC?6 (Central)
• **Summer (DST)**	UTC?5 (Central)
ZIP Codes	46303, 46307–08, 46311–12, 46319–25, 46327, 46341–42, 46355–56, 46373, 46375–77, 46394, 46401–11
Area code	219
Congressional district	1st
Indiana Senate districts	1st, 2nd, 3rd and 6th
Indiana House of Representatives districts	1st, 2nd, 3rd, 11th, 12th, 14th, 15th and 19th
FIPS code	18-089
GNIS feature ID	0450495
Interstates	Image not found or type unknown

U.S. Routes	Image not found or type unknown Image not found or type unknown
State Routes	Image not found or type unknown Image not found or type unknown
Airports	Gary/Chicago International Griffith-Merrillville
Waterways	Grand Calumet River Indiana Harbor and Ship Canal Kankakee River Lake Michigan
Amtrak stations	Dyer – Hammond-Whiting
South Shore Line stations	Hammond Gateway – East Chicago Adam Benjamin Metro Center Gary/Chicago Airport – Miller
Public transit	East Chicago Transit Gary Public Transportation *Broadway Metro Express*
Website	www.lakecountyin.org

- Indiana county number 45
- Second most-populous county in Indiana

Lake County is a county located in the U.S. state of Indiana. In 2020, its population was 498,700,[9] making it Indiana's second-most populous county. The county seat is Crown Point.[10] The county is part of Northwest Indiana and the Chicago metropolitan area, and contains a mix of urban, suburban and rural areas. It is bordered on the north by Lake Michigan and contains a portion of the Indiana Dunes.[11][12] It includes Marktown, Clayton Mark's planned worker community in East Chicago.[13]

History

[edit]

Early settlement

[edit]

Originally inhabited by the Potawatomi and generations of indigenous ancestors, Lake County was established by European Americans on February 16, 1837.[2] From 1832 to 1836 the area that was to become Lake County was part of La Porte County.[14] From 1836 to 1837 it was part of Porter County.[14] It was named for its location on Lake Michigan.[15] The original county seat was Liverpool, but in 1840 Lake Court House, later renamed as Crown Point, was chosen.[16]

Lake County's population grew slowly before the 1850s. Construction of railroads to link Chicago to the rest of the country stimulated rapid development, and tens of thousands of settlers and immigrants bought land in the region. Small-scale industrialization began, but was primarily relegated to the northern coast of the county, where it could take advantage of the railroads along the coast and shipping on the Great Lakes. The 1900 Census gives a population of 37,892 residents.

Industrialization and immigration

[edit]

Inland Steel Company established a plant in East Chicago in 1903 and U.S. Steel founded one in Gary in 1906; with industrial jobs the demand for labor associated with industrial jobs, the county's population exploded. Immigrants poured into the area from all over Central and Eastern Europe (there was also a smaller Mexican immigrant community). In addition, both black and white migrants came from many regions of the United States, particularly Appalachia and the South. Mostly rural blacks went north in the Great Migration, seeking both industrial jobs and escape from Jim Crow violence and disenfranchisement in the South.

By 1930, Lake County's population surpassed 260,000, with first- and second-generation Americans constituting a majority of the population. The second wave of the Ku Klux Klan gained a large following here in the 1920s, as it did for a time in the rest of Indiana. The KKK organized against the numerous European immigrants, who were mostly Catholic. While the steel industry reigned supreme, other industries also found the county to be an ideal location for cheap land and well-developed transportation networks, such as automobiles, oil, chemicals, consumer goods, food processing, and construction supply companies.[17]

The Great Depression was devastating to Lake County, as it was to other areas with economies based on heavy industry. The Depression, combined with industrial strife, changing demographics, and unionization, caused a realignment of politics in Lake County. It became a stronghold of the Democratic Party; Lake County has supported the Democratic nominee for president in every election since 1932 (exceptions occurred in 1956 and 1972). Indiana's 1st congressional district has elected Democratic candidates in every election since 1930.

World War II restored prosperity, as industry revived to support the war effort. Good economic times continued into the 1970s. During this period, unions helped industrial workers gain middle-class wages. In addition to attracting refugees and immigrants from Europe, black Americans and Mexicans migrated here in the postwar period in even higher numbers than in the 1910-1930 period. As minority populations exploded in such industrial cities as East Chicago and Gary,

racial tensions surfaced again. Following construction of state and federal highways, development of cheaper land provided newer housing to middle-class people who could afford it. Both whites and established black families moved out of the aging industrial cities.[17]

Recent history

[edit]

Lake County's population peaked at 546,000 in 1970. Severe industrial decline took place during the 1973-1991 period, brought on by foreign competition, new management philosophies that called for major workforce reductions, and productivity gains from technology. The decline was particularly intense in the steel industry: steel employment exceeded 60,000 in the 1960s, and declined progressively to just 18,000 by 2015. Lake County's population declined 13% to bottom out at 475,000 in 1990.

The industrial decline of the 1980s cast a long shadow over Lake County: the county did not regain the level of employment it had in 1980 until 1996, after which the employment level roughly flatlined. The county's economic output peaked in 1978, and has not since recovered, remaining 15-20% below the peak after adjusting for inflation. As prosperity declined, so did the immigration that powered the county's explosive population growth before 1950: per the 2000 census, only 5.3% of Lake County's residents were foreign-born, compared to over 11% for the United States as a whole.[18]

The population recovered somewhat during the 1990s and 2000s, as the local economy adjusted. Suburban growth has also been driven by commuter populations of workers who are employed in Chicago and commute via expressways or the South Shore Line. In 2007, it was estimated that 44,000 workers commuted from Lake County, Indiana, to Chicago for work.[18] The decline of industrial cities and growth of suburbs has been so sharp, that by 1990 a majority of the county's population lived outside of the four traditional industrial cities. Lake County still continues to struggle with urban decline and poverty, suburban sprawl and traffic jams, and a stagnating population.[17]

Geography

[edit]

According to the 2010 census, the county has a total area of 626.56 square miles (1,622.8 km^2), of which 498.96 square miles (1,292.3 km^2) (or 79.63%) is land and 127.60 square miles (330.5 km^2) (or 20.37%) is water. It is the second-largest county in total area in Indiana, but has the largest water area of all 92 counties.[19]

The northern and southern portions of the county (north of U.S. 30 and south of Lowell) are mainly low and flat, except for a few sand ridges and dunes and were both once very marshy and had to be drained. The lowest point, at 585 feet (178 m),[7] is along the Lake Michigan shoreline.

The central part of the county is higher and hillier. As you travel south from the low and relatively flat lake plain in the northern part of the county, the land gradually rises in elevation until the peak of the Valparaiso Moraine. The highest point, at 801 feet (244 m),[6] is in northeastern Winfield Township near 109th Street and North Lakeshore Drive in Lakes of the Four Seasons. From here the land descends south into the Kankakee Outwash Plain until the Kankakee River is reached.

The geographic center of Lake County is approximately 200 feet (60 m) northwest of Burr Street and West 113th Avenue in Center Township

41°24?53.8?N 87°24?14.3?WÃ¯Â»Â¿ / Ã¯Â»Â¿41.414944°N 87.403972°W.

Adjacent counties

[edit]

- Cook County, Illinois (northwest)
- Will County, Illinois (west)
- Kankakee County, Illinois (southwest)
- Porter County (east)
- Jasper County (southeast)
- Newton County (south)

National protected area

- Indiana Dunes National Park – *also in LaPorte and Porter counties*

Transit

- East Chicago Transit
- Gary Public Transportation Corporation (*Broadway Metro Express*)

Airports

- Gary/Chicago International Airport
- Griffith-Merrillville Airport

Major highways

Interstate 65 in Lake County is called the Casimir Pulaski Memorial Highway. Interstate 80/94/US 6 is the Frank Borman Expressway from the Illinois state line east to the Indiana Toll Road interchange in the eastern portion of the county. Interstate 94 has been referred to as the Chicago-Detroit Industrial Freeway. US 6 is part of the Grand Army of the Republic Highway.

Broadway (Indiana 53) is also the Carolyn Mosby Memorial Highway. Indiana 51 is known for its entire length as the Adam Benjamin Memorial Highway. US 30 is part of the historic Lincoln Highway. US 12 from Gary eastward is part of Dunes Highway. Cline Avenue (Indiana 912) from US 12 north and westward is known as the Highway Construction Workers Memorial Highway.

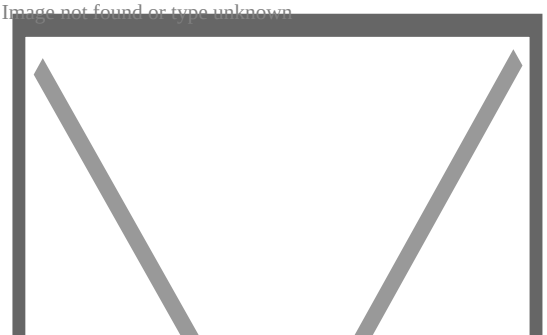
- Interstate 65
- Interstate 80
- Indiana Toll Road
- Interstate 94
- U.S. Route 6
- U.S. Route 12
- U.S. Route 20
- U.S. Route 30
- U.S. Route 41
- U.S. Route 231
- State Road 2
- State Road 51
- State Road 53
- State Road 55
- State Road 130
- State Road 152
- State Road 312
- State Road 912

Railroads

- Amtrak
- Canadian National Railway
- Chicago, Fort Wayne and Eastern Railroad
- Chicago South Shore and South Bend Railroad
- CSX Transportation
- Gary Railway
- Indiana Harbor Belt Railroad
- Norfolk Southern Railway
- South Shore Line

Municipalities

[edit]



The municipalities in Lake County, and their populations as of the 2020 Census, are:

Cities

[edit]

- Crown Point – 33,899
- East Chicago – 26,370
- Gary – 69,093
- Hammond – 77,879
- Hobart – 29,752
- Lake Station – 13,235
- Whiting – 4,559

Towns

[edit]

- Cedar Lake – 14,106
- Dyer – 16,517
- Griffith – 16,528
- Highland – 23,984
- Lowell – 10,680
- Merrillville – 36,444
- Munster – 23,894
- New Chicago – 1,999
- Schererville – 29,646
- Schneider – 269
- St. John – 20,303
- Winfield – 7,181

Census-designated places

[edit]

- Lake Dalecarlia – 1,332
- Lakes of the Four Seasons – 3,936
  (7,091 including portion in Porter County)
- Shelby – 453

Unincorporated communities

[edit]

- Ainsworth
- Belshaw
- Brunswick
- Creston
- Deep River
- Deer Creek
- Dinwiddie
- Green Acres
- Klaasville
- Kreitzburg
- Leroy
- Liverpool
- New Elliott
- Orchard Grove
- Palmer
- Range Line
- Ross
- Southeast Grove

Townships

[edit]

The 11 townships of Lake County, with their populations as of the 2020 Census, are:

- Calumet – 91,970
- Cedar Creek – 12,725
- Center – 38,630
- Eagle Creek – 1,719
- Hanover – 18,214
- Hobart – 40,652
- North – 156,686
- Ross – 48,529
- St. John – 68,972
- West Creek – 7,676
- Winfield – 12,927

Economy

[edit]

Despite the decline of heavy industry, manufacturing was still the largest employment sector in Lake County in 2010 with over 45,000 workers employed, followed closely by healthcare and social assistance at 44,000 workers, public administration at 40,000 workers, retail trade at 37,000 workers, accommodation and food services at 25,000 workers, and construction at 15,000 workers.[18]

Lake County's GDP in 2010 was measured at nearly $25 billion. Manufacturing was also the largest sector of the economy in economic terms, contributing over $5.8 billion to the county's GDP in 2010. It was followed by healthcare and social assistance at $2.6 billion, public administration at $2.5 billion, and retail trade at $1.9 billion. While Lake County's average income was approximately 24% higher than the national average in 1978, in 2010 Lake County had fallen significantly behind the United States as a whole, with average income being approximately 12.9% lower. The national average surpassed Lake County sometime around 1986.

Businesses with the largest number of employees in the county are: [20]

- Americall Group, Inc. – Hobart
- Ameristar Casino – East Chicago
- BP Whiting Refinery – Whiting
- Canadian National Railway – Whiting
- Cargill – Hammond
- Cleveland-Cliffs Indiana Harbor Works – East Chicago
- Community Hospital – Munster
- Franciscan Alliance, Inc. – *locations throughout the region*
- Franciscan Health Hammond – Hammond *(closed)*
- Hard Rock Casino Northern Indiana – Gary
- Horseshoe Casino – Hammond
- Majestic Star Casino – Gary *(closed)*
- Methodist Hospitals Northlake Campus – Merrillville
- NiSource – Merrillville
- Radisson Hotel at Star Plaza – Merrillville *(closed)*
- St. Catherine Hospital – East Chicago
- St. Mary Medical Center – Hobart
- Times Media Company – Munster
- Unilever – Whiting
- U.S. Steel Gary Works – Gary

Education

[edit]

Public school districts

[edit]

The administration of public schools in Lake County is divided among 16 corporations and governing bodies,[21] more than any other Indiana county.[22]

- Crown Point Community School Corporation – Center and Winfield townships
- Gary Community School Corporation – City of Gary
- Griffith Public Schools – Town of Griffith
- Hanover Community School Corporation – Hanover Township
- Lake Central School Corporation – St. John Township
- Lake Ridge Schools Corporation – unincorporated Calumet Township
- Lake Station Community Schools – City of Lake Station
- Merrillville Community School Corporation – Ross Township
- River Forest Community School Corporation – Town of New Chicago and some portions of adjacent communities
- School City of East Chicago – City of East Chicago
- School City of Hammond – City of Hammond
- School City of Hobart – City of Hobart within Hobart Township
- School City of Whiting – City of Whiting
- School Town of Highland – Town of Highland
- School Town of Munster – Town of Munster
- Tri-Creek School Corporation – Cedar Creek, Eagle Creek and West Creek townships

Private schools

[edit]

Elementary and secondary schools operated by the Diocese of Gary:

- Andrean High School, Merrillville (9–12)
- Aquinas School at St. Andrew's, Merrillville (PK–8)
- Bishop Noll Institute, Hammond (9–12)
- Our Lady of Grace, Highland (PK–8)
- St. Casimir, Hammond (PK–8)
- St. John Bosco, Hammond (PK–8)
- St. John the Baptist, Whiting (PK–8)
- St. John the Evangelist, St. John (PK–8)
- St. Mary, Crown Point (PK–8)
- St. Mary, Griffith (PK–8)
- St. Michael, Schererville (PK–8)
- St. Stanislaus, East Chicago (PK–8)
- St. Thomas More, Munster (PK–8)

Other parochial and private schools:

- St. Paul's Lutheran School, Munster (PK–8)
- Trinity Lutheran School, Crown Point (PK–8)

- Trinity Lutheran School, Hobart (PK–8)

Colleges and universities

[edit]

- Calumet College of St. Joseph
- Hyles–Anderson College
- Indiana University Northwest
- Ivy Tech Community College
- Purdue University Northwest[23]
- University of Phoenix
- Indiana Wesleyan University

Public libraries

[edit]

The county is served by seven different public library systems:

- Crown Point Community Library has its main location with a branch in Winfield.[24]
- East Chicago Public Library has its main location and the Robart A. Pastrick branch.[25]
- Gary Public Library has its main location, the Gary Public Library and Cultural Center, and the Kennedy and Woodson branches.[26]
- Hammond Public Library[27]
- Lake County Public Library has its main location in Merrillville as well as Cedar Lake, Dyer-Schererville, Griffith-Calumet Township, Highland, Hobart, Lake Station-New Chicago, Munster and St. John branches.[28]
- Lowell Public Library has its main location with branches in Schneider and Shelby.[29]
- Whiting Public Library[30]

Hospitals

[edit]

- Community Hospital, Munster – 454 beds[31]
- Franciscan Health Crown Point, Crown Point – 203 beds *(Level III Trauma Center)*[31][32][33]
- Franciscan Health Dyer, Dyer – 223 beds[31][32]
- Franciscan Health Munster, Munster – 63 beds[31][32]
- Methodist Hospitals – 536 beds[31]
  - Northlake Campus, Gary
  - Southlake Campus, Merrillville
- NW Indiana ER and Hospital, Hammond – 6 beds[31]
- St. Catherine Hospital, East Chicago – 216 beds[31]

- St. Mary Medical Center, Hobart – 215 beds[31]
- UChicago Medicine Crown Point, Crown Point – 8 beds *(opening April 2024)*[34]

Media

[edit]

The Times, based in Munster, is the largest daily newspaper in Lake County and Northwest Indiana and the second largest in the state. Lake County is also served by the *Post-Tribune*, a daily newspaper based in Merrillville.

Lakeshore Public Television operates WYIN-TV Gary on channel 56 and is the local PBS station in the Chicago television market.

These eight broadcast radio stations serve Lake County and are part of the Chicago market:

- WJOB (1230 AM) – Hammond
- WWCA (1270 AM) – Gary
- WLTH (1370 AM) – Gary
- WLPR (89.1 FM) – Lowell
- WRTW (90.5 FM) – Crown Point
- WPWX (92.3 FM) – Hammond
- WXRD (103.9 FM) – Crown Point
- WZVN (107.1 FM) – Lowell

Climate and weather

[edit]

Climate data for Lowell, Indiana (1981-2010 normals, extremes 1963-present)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	66 (19)	73 (23)	85 (29)	91 (33)	95 (35)	104 (40)	101 (38)	104 (40)	98 (37)	92 (33)	77 (25)	70 (21)	104 (40)
Mean daily maximum °F (°C)	31.2 (?0.4)	35.8 (2.1)	47.5 (8.6)	60.8 (16.0)	71.3 (21.8)	80.7 (27.1)	83.8 (28.8)	82.0 (27.8)	76.4 (24.7)	63.6 (17.6)	49.4 (9.7)	35.1 (1.7)	59.8 (15.5)
Daily mean °F (°C)	22.8 (?5.1)	26.7 (?2.9)	37.4 (3.0)	49.3 (9.6)	59.8 (15.4)	69.7 (20.9)	73.1 (22.8)	71.1 (21.7)	64.2 (17.9)	51.9 (11.1)	40.2 (4.6)	27.1 (?2.7)	49.4 (9.7)
Mean daily minimum °F (°C)	14.4 (?9.8)	17.7 (?7.9)	27.4 (?2.6)	37.9 (3.3)	48.2 (9.0)	58.7 (14.8)	62.4 (16.9)	60.3 (15.7)	52.0 (11.1)	40.2 (4.6)	31.0 (?0.6)	19.1 (?7.2)	39.1 (3.9)
Record low °F (°C)	?28 (?33)	?23 (?31)	?9 (?23)	7 (?14)	26 (?3)	33 (1)	41 (5)	38 (3)	28 (?2)	18 (?8)	2 (?17)	?29 (?34)	?29 (?34)

Average precipitation inches (mm)	1.96 (50)	1.75 (44)	2.57 (65)	3.78 (96)	4.38 (111)	4.69 (119)	4 (100)	3.98 (101)	3.14 (80)	3.44 (87)	3.43 (87)	2.34 (59)	39.46 (999)
Average snowfall inches (cm)	8.8 (22)	8.2 (21)	3.4 (8.6)	0.3 (0.76)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.2 (0.51)	0.7 (1.8)	7.7 (20)	29.3 (74.67)

Source: NOAA (normals, 1981–2010)[35]

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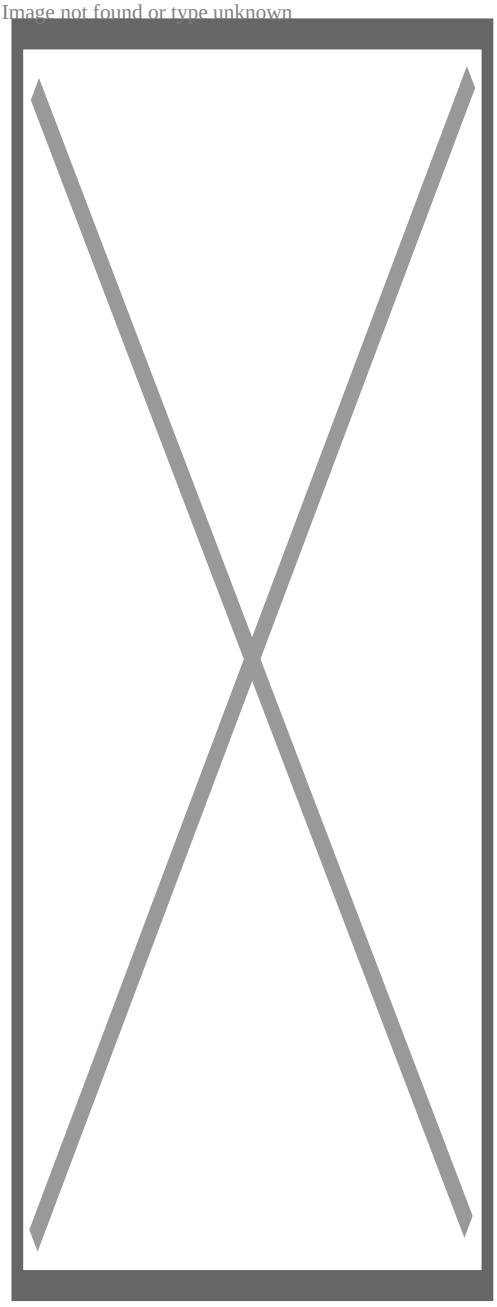

Satellite imagery of Lake County, IN

In recent years, average temperatures in Lowell have ranged from a low of 14.4 °F (?9.8 °C) in January to a high of 83.8 °F (28.8 °C) in July, although a record low of ?29 °F (?34 °C) was

recorded in December 1989 and a record high of 104 °F (40 °C) was recorded in June 1988. Average monthly precipitation ranged from 1.75 inches (44 mm) in February to 4.69 inches (119 mm) in June. Temperatures at or below 0 °F (?18 °C) occur on average 11 days annually and exceed 90 °F (32 °C) degrees on 14 days.[35] In winter, lake-effect snow increases snowfall totals compared to the areas to the west.[36] In spring and early summer, the immediate shoreline areas sometimes experience lake-breeze that can drop temperatures by several degrees compared to areas further inland.[37] In summer, thunderstorms are common, occurring an average 40–50 days every year,[38] and on about 13 days, these thunderstorms produce severe winds.[39]

Government

[edit]
See also: Government of Indiana

The county government is a constitutional body, and is granted specific powers by the Constitution of Indiana, and by the Indiana Code.

County Council: The county council is the legislative branch of the county government and controls all the spending and revenue collection in the county. Representatives are elected from county districts. The council members serve four-year terms. They are responsible for setting salaries, the annual budget, and special spending. The council also has limited authority to impose local taxes, in the form of an income and property tax that is subject to state level approval, excise taxes, and service taxes.[40][41]

Board of Commissioners: The executive body of the county is made of a board of commissioners. The commissioners are elected county-wide, in staggered terms, and each serves a four-year term. One of the commissioners, typically the most senior, serves as president. The commissioners are charged with executing the acts legislated by the council, collecting revenue, and managing the day-to-day functions of the county government.[40][41]

Court: The county maintains a small claims court that can handle some civil cases. The judge on the court is elected to a term of four years and must be a member of the Indiana Bar Association. The judge is assisted by a constable who is also elected to a four-year term. In some cases, court decisions can be appealed to the state level circuit court.[41]

County Officials: The county has several other elected offices, including sheriff, coroner, auditor, treasurer, recorder, surveyor, and circuit court clerk Each of these elected officers serves a term of four years and oversees a different part of county government. Members elected to county government positions are required to declare party affiliations and to be residents of the county.[41]

County elected officials

[edit]

Board of Commissioners:[3]

- Kyle W. Allen, Sr. (D, 1st)†
- Jerry J. Tippy (R, 2nd)
- Michael C. Repay (D, 3rd)

County Council:[3]

- David Hamm (D, 1st)
- Ronald Brewer (D, 2nd)
- Charlie Brown (D, 3rd)
- Pete Lindemulder (R, 4th)
- Christine Cid (D, 5th)
- Ted F. Bilski (D, 6th)†
- Randy Niemeyer (R, 7th)

Elected Officials:[3]

- Assessor: LaTonya Spearman (D)
- Auditor: Peggy Katona (D)
- Clerk: Michael Brown (D)
- Coroner: David Pastrick (D)
- Prosecutor: Bernard A. Carter (D)
- Recorder: Gina Pimentel (D)
- Sheriff: Oscar Martinez, Jr. (D)[42]
- Surveyor: Bill Emerson, Jr. (D)
- Treasurer: John Petalas (D)

† *President*

Politics

[edit]

While the state of Indiana is strongly Republican, having voted Republican in every election since 1964 (except in 2008), Lake County has long been a Democratic stronghold due to being part of the Chicago metropolitan area. It has given pluralities or majorities to Democrats in every presidential election since 1932 with the exceptions of 1956 and 1972. Like the rest of the Rust Belt, however, Lake County has recently trended Republican, with Donald Trump scoring the highest percentage of the vote since 1972 in the 2024 presidential election.

Lake is part of Indiana's 1st congressional district, which is held by Democrat Frank J. Mrvan.[43] In the State Senate, Lake is part of the 1st, 2nd, 3rd and 6th districts, which are held by three Democrats and one Republican. In the Indiana House of Representatives, Lake is part of the 1st, 2nd, 3rd, 11th, 12th, 14th, 15th and 19th districts, which are held by four Democrats and four Republicans.

United States presidential election results for Lake County, Indiana[44]

Year	Republican		Democratic		Third party(ies)	
	No.Ã¢â,¬Â¯	%	No.Ã¢â,¬Â¯	%	No.Ã¢â,¬Â¯	%
2024	97,270	46.30%	109,086	**51.92%**	3,746	1.78%
2020	91,760	41.65%	124,870	**56.67%**	3,700	1.68%
2016	75,625	37.29%	116,935	**57.66%**	10,241	5.05%
2012	68,431	33.85%	130,897	**64.75%**	2,819	1.39%
2008	67,742	32.41%	139,301	**66.64%**	1,996	0.95%
2004	71,903	38.24%	114,743	**61.03%**	1,376	0.73%
2000	63,389	36.02%	109,078	**61.98%**	3,527	2.00%

1996	47,873	29.22%	100,198	**61.15%**	15,789	9.64%
1992	53,867	28.91%	102,778	**55.17%**	29,653	15.92%
1988	79,929	43.03%	105,026	**56.55%**	780	0.42%
1984	94,870	44.30%	117,984	**55.10%**	1,289	0.60%
1980	95,408	46.02%	101,145	**48.78%**	10,786	5.20%
1976	90,119	42.36%	120,700	**56.74%**	1,922	0.90%
1972	115,480	**56.24%**	88,510	43.10%	1,352	0.66%
1968	77,911	36.48%	99,897	**46.77%**	35,766	16.75%
1964	73,722	35.19%	134,978	**64.42%**	823	0.39%
1960	78,278	37.04%	132,554	**62.72%**	526	0.25%
1956	92,803	**52.00%**	85,000	47.63%	657	0.37%
1952	74,073	44.66%	90,721	**54.70%**	1,051	0.63%
1948	51,413	38.77%	77,025	**58.09%**	4,157	3.14%
1944	48,147	38.84%	75,066	**60.56%**	737	0.59%
1940	45,898	38.79%	71,985	**60.83%**	447	0.38%
1936	33,689	32.47%	68,551	**66.07%**	1,510	1.46%
1932	42,596	46.56%	46,060	**50.34%**	2,836	3.10%
1928	48,768	**59.68%**	32,321	39.55%	630	0.77%
1924	30,990	**64.61%**	10,918	22.76%	6,060	12.63%
1920	26,296	**69.15%**	7,136	18.77%	4,596	12.09%
1916	13,262	**55.00%**	9,946	41.25%	903	3.75%
1912	5,176	29.61%	5,136	29.38%	7,171	**41.02%**
1908	9,499	**60.97%**	5,502	35.32%	578	3.71%
1904	6,429	**64.11%**	2,933	29.25%	666	6.64%
1900	5,337	**58.00%**	3,733	40.57%	131	1.42%
1896	4,883	**58.11%**	3,418	40.68%	102	1.21%
1892	2,958	48.02%	3,010	**48.86%**	192	3.12%
1888	2,543	**54.21%**	2,068	44.08%	80	1.71%

2008 presidential primary

[edit]

In the 2008 Democratic presidential primary on May 6, 2008, Lake County was one of the last counties to report results.[45] Lake County had reported no results at 11 p.m. ET,[46] and at midnight ET, only 28% of Lake County's vote had been reported.[47] A large number of absentee ballots and a record turnout delayed the tallies, and polls closed an hour later than much of the state because Lake County is in the Central Time Zone.[46] Early returns showed Senator Barack Obama leading by a potentially lead-changing margin, leaving the race between Senator Hillary Clinton and Obama "too close to call" until final tallies were reported.

Crime

The NWI Times reported that over 800 registered sex offenders live in Lake and Porter Counties of Indiana in 2021.[48]

Culture and contemporary life

[edit]

Entertainment and the arts

[edit]

- Northwest Indiana Symphony Orchestra, concerts held at Living Hope Church – Merrillville
- Theatre at the Center, located at the Center for Visual and Performing Arts – Munster

Major attractions

[edit]

- Ameristar Casino – East Chicago
- Horseshoe Casino – Hammond
- Majestic Star Casino – Gary
- Majestic Star Casino II – Gary
- Pierogi Fest – Whiting
- Southlake Mall – Hobart
- Three Floyds Brewing – Munster

Professional sports teams

[edit]

- Gary SouthShore RailCats, an American Association professional baseball team, play their games at U.S. Steel Yard in Gary.

Recreation

[edit]

List of parks and recreational facilities – Lake County Parks and Recreation

- Bellaboo's Play and Discovery Center – Lake Station
- Buckley Homestead – Lowell
- Cedar Creek Family Golf Center – Cedar Lake

- Deep River County Park – Hobart
- Deep River Waterpark – Crown Point
- Gibson Woods Nature Preserve – Hammond
- Grand Kankakee Marsh – Hebron
- Lake Etta – Gary
- Lemon Lake – Crown Point
- Oak Ridge Prairie & Oak Savannah Trail – Griffith
- Stoney Run County Park – Hebron
- Three Rivers County Park – Lake Station
- Turkey Creek Golf Course – Merrillville
- Whihala Beach – Whiting

List of recreational facilities – Indiana Dunes National Park

- Calumet Prairie State Nature Preserve – Lake Station
- Hobart Prairie Grove – Hobart
- Hoosier Prairie State Nature Preserve – Griffith
- Paul H. Douglas Center for Environmental Education – Gary

Demographics

[edit]

Historical population

Census	Pop.	Note	%±
1840	1,468		—
1850	3,991		171.9%
1860	9,145		129.1%
1870	12,339		34.9%
1880	15,091		22.3%
1890	23,886		58.3%
1900	37,892		58.6%
1910	82,864		118.7%
1920	159,957		93.0%
1930	261,310		63.4%
1940	293,195		12.2%
1950	368,152		25.6%
1960	513,269		39.4%
1970	546,253		6.4%
1980	522,965		?4.3%
1990	475,594		?9.1%
2000	484,564		1.9%

2010	496,005	2.4%
2020	498,700	0.5%
2023 (est.)	500,598 [49]	0.4%

U.S. Decennial Census[50]
1790-1960[51] 1900-1990[52]
1990-2000[53] 2010-2019[9]

2020 census

[edit]

Lake County, Indiana – Racial and ethnic composition

Note: the US Census treats Hispanic/Latino as an ethnic category. This table excludes Latinos from the racial categories and assigns them to a separate category. Hispanics/Latinos may be of any race.

Race / Ethnicity (*NH = Non-Hispanic*)	Pop 2000[54]	Pop 2010[55]	Pop 2020[56]	% 2000	% 2010	% 2020
White alone (NH)	293,457	274,162	251,106	60.56%	55.27%	50.35%
Black or African American alone (NH)	121,372	125,506	121,048	25.05%	25.30%	24.27%
Native American or Alaska Native alone (NH)	854	913	691	0.18%	0.18%	0.14%
Asian alone (NH)	3,862	5,981	7,334	0.80%	1.21%	1.47%
Pacific Islander alone (NH)	106	63	95	0.02%	0.01%	0.02%
Other race alone (NH)	450	463	1,682	0.09%	0.09%	0.34%
Mixed race or Multiracial (NH)	5,335	6,254	16,817	1.10%	1.26%	3.37%
Hispanic or Latino (any race)	59,128	82,663	99,927	12.20%	16.67%	20.04%
Total	**484,564**	**496,005**	**498,700**	**100.00%**	**100.00%**	**100.00%**

As of the 2010 United States Census, there were 496,005 people, 188,157 households, and 127,647 families residing in the county.[57] The population density was 994.1 inhabitants per square mile (383.8/km^2). There were 208,750 housing units at an average density of 418.4 per square mile (161.5/km^2).[19] The racial makeup of the county was 64.4% white, 25.9% black or African American, 1.2% Asian, 0.3% American Indian, 5.8% from other races, and 2.4% from two or more races. Those of Hispanic or Latino origin made up 16.7% of the population.[57] In terms of ancestry, 16.1% were German, 11.1% were Irish, 9.6% were Polish, 5.4% were English, 4.8% were Italian and 3.7% were American.[58]

Of the 188,157 households, 34.3% had children under the age of 18 living with them, 44.7% were married couples living together, 17.4% had a female householder with no husband present, 32.2% were non-families, and 27.4% of all households were made up of individuals. The average household size was 2.60 and the average family size was 3.19. The median age was 37.4 years.[57]

The median income for a household in the county was $47,697 and the median income for a family was $58,931. Males had a median income of $50,137 versus $33,264 for females. The per capita income for the county was $23,142. About 12.2% of families and 16.1% of the population were below the poverty line, including 25.3% of those under age 18 and 8.4% of those age 65 or over.[59]

Places by population and race[60]

Place	Population (2010)	White	Black or African American	Asian	Other [note 1]	Hispanic or Latino (of any race)
Lake County	496,005	64.4%	25.9%	1.2%	8.5%	16.7%
Cedar Lake, *town*	11,560	94.9%	0.5%	0.4%	4.2%	6.5%
Crown Point, *city*	27,317	88.2%	6.3%	1.8%	3.7%	8.1%
Dyer, *town*	16,390	90.1%	2.5%	2.9%	4.5%	9.3%
East Chicago, *city*	29,698	35.5%	42.9%	0.1%	21.5%	50.9%
Gary, *city*	80,294	10.7%	84.8%	0.2%	4.3%	5.1%
Griffith, *town*	16,893	75.8%	16.9%	0.8%	6.5%	13.3%
Hammond, *city*	80,830	59.4%	22.5%	1.0%	17.1%	34.1%
Highland, *town*	23,727	88.6%	4.2%	1.6%	5.6%	12.8%
Hobart, *city*	29,059	85.3%	7.0%	1.0%	6.7%	13.9%
Lake Dalecarlia, *CDP*	1,355	97.3%	0.2%	0.1%	2.4%	3.4%
Lake Station, *city*	12,572	79.7%	3.6%	0.3%	16.4%	28.0%
Lakes of the Four Seasons, *CDP*[note 2]	7,033	93.4%	1.2%	1.0%	4.4%	8.5%
Lowell, *town*	9,276	95.9%	0.5%	0.3%	3.3%	6.9%
Merrillville, *town*	35,246	46.4%	44.5%	1.2%	7.9%	12.9%
Munster, *town*	23,603	85.6%	3.5%	5.8%	5.1%	10.2%
New Chicago, *town*	2,035	81.0%	2.2%	0.7%	16.1%	27.4%
St. John, *town*	14,850	93.5%	1.3%	1.3%	3.9%	8.2%
Schererville, *town*	29,243	86.8%	5.4%	2.8%	5.0%	10.6%
Schneider, *town*	277	97.1%	0.0%	1.1%	1.8%	2.5%
Shelby, *CDP*	539	95.5%	1.7%	0.2%	2.6%	0.9%
Whiting, *city*	4,997	76.3%	3.5%	0.7%	19.5%	40.7%
Winfield, *town*	4,383	88.5%	3.7%	3.5%	4.3%	8.9%

Places by population and standard of living[61][62]

Place	Population (2010)	Per capita income	Median household income	Median home value
Lake County	496,005	$23,792	$49,315	$137,400
Cedar Lake, *town*	11,560	$25,477	$59,090	$151,400

Crown Point, *city*	27,317	$31,454	$64,876	$174,900
Dyer, *town*	16,390	$35,020	$78,881	$197,500
East Chicago, *city*	29,698	$13,457	$27,171	$86,800
Gary, *city*	80,294	$15,764	$26,956	$66,900
Griffith, *town*	16,893	$26,548	$53,225	$141,600
Hammond, *city*	80,830	$18,148	$38,677	$94,800
Highland, *town*	23,727	$30,036	$61,930	$155,200
Hobart, *city*	29,059	$24,740	$54,468	$134,400
Lake Dalecarlia, *CDP*	1,355	$25,035	$52,321	$165,400
Lake Station, *city*	12,572	$16,953	$36,955	$82,400
Lakes of the Four Seasons, *CDP*[note 2]	7,033	$32,908	$84,242	$182,600
Lowell, *town*	9,276	$23,619	$60,549	$146,500
Merrillville, *town*	35,246	$23,605	$53,470	$132,600
Munster, *town*	23,603	$34,735	$70,708	$197,600
New Chicago, *town*	2,035	$18,083	$38,672	$97,700
St. John, *town*	14,850	$36,490	$97,868	$254,600
Schererville, *town*	29,243	$33,984	$68,004	$204,300
Schneider, *town*	277	$18,774	$50,972	$89,500
Shelby, *CDP*	539	$29,700	$61,667	$89,700
Whiting, *city*	4,997	$21,427	$44,368	$111,500
Winfield, *town*	4,383	$23,792	$49,315	$137,400

See also

[edit]

- Lake County Indiana Sheriff's Department
- List of public art in Lake County, Indiana
- National Register of Historic Places listings in Lake County, Indiana

Image not found or type unknown

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Notes

[edit]

1. **^** Other = Combined percentages for American Indian or Alaska Native; Native Hawaiian or Pacific Islander; other races; and two or more races
2. ^ ***a b*** Population is 3,936 within Lake County; 3,097 reside in Porter County

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External links

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- Lake County official website
- Lake County Parks
- South Shore Convention & Visitors Authority

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Places adjacent to Lake County, Indiana

Cook County, Illinois — Lake Michigan

Will County, Illinois — **Lake County, Indiana** — Porter County

Kankakee County, Illinois — Newton County — Jasper County

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Municipalities and communities of Lake County, Indiana, United States

County seat: **Crown Point**

Cities	○ Crown Point ○ East Chicago ○ Gary ○ Hammond ○ Hobart ○ Lake Station ○ Whiting
Towns	○ Cedar Lake ○ Dyer ○ Griffith ○ Highland ○ Lowell ○ Merrillville ○ Munster ○ New Chicago ○ St. John ○ Schererville ○ Schneider ○ Winfield
Townships	○ Calumet ○ Cedar Creek ○ Center ○ Eagle Creek ○ Hanover ○ Hobart ○ North ○ Ross ○ St. John ○ West Creek ○ Winfield
CDPs	○ Lake Dalecarlia ○ Lakes of the Four Seasons‡ ○ Leroy ○ Ross ○ Shelby

Map of Indiana highlighting Lake County

Other communities	○ Ainsworth ○ Belshaw ○ Brunswick ○ Creston ○ Deep River ○ Deer Creek ○ Dinwiddie ○ Green Acres ○ Klaasville ○ Kreitzburg ○ Liverpool ○ New Elliott ○ Orchard Grove ○ Palmer ○ Range Line ○ Southeast Grove
Ghost town	○ Indiana City
Footnotes	‡This populated place also has portions in an adjacent county or counties.

- Indiana portal
- United States portal

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Chicago metropolitan area

Chicago landsat image

Major city	○ **Chicago**

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Cities (over 30,000 in 2020)	○ Aurora ○ Berwyn ○ Calumet City ○ Crown Point ○ Crystal Lake ○ DeKalb ○ Des Plaines ○ Elgin ○ Elmhurst ○ Evanston ○ Gary ○ Hammond ○ Highland Park ○ Joliet ○ Kenosha ○ Naperville ○ North Chicago ○ Park Ridge ○ Portage ○ St. Charles ○ Valparaiso ○ Waukegan ○ Wheaton

Towns and villages (over 30,000 in 2020)	○ Addison ○ Arlington Heights ○ Bartlett ○ Bolingbrook ○ Buffalo Grove ○ Carol Stream ○ Carpentersville ○ Cicero ○ Downers Grove ○ Elk Grove Village ○ Glendale Heights ○ Glenview ○ Grayslake ○ Gurnee ○ Hanover Park ○ Hoffman Estates ○ Lombard ○ Merrillville ○ Mount Prospect ○ Mundelein ○ Niles ○ Northbrook ○ Oak Lawn ○ Oak Park ○ Orland Park ○ Oswego ○ Palatine ○ Plainfield ○ Romeoville ○ Schaumburg ○ Skokie ○ Streamwood ○ Tinley Park ○ Wheeling ○ Wonder Lake ○ Woodridge

Counties	○ Cook ○ DeKalb ○ DuPage ○ Grundy ○ Jasper ○ Kane ○ Kankakee ○ Kendall ○ Kenosha ○ Lake, IL ○ Lake, IN ○ McHenry ○ Newton ○ Porter ○ Will
Regions	○ Great Lakes ○ Northern Illinois ○ Northern Indiana
Sub-regions	○ Chicago Southland ○ Eastern Ridges and Lowlands ○ Fox Valley (Illinois River) ○ Golden Corridor ○ Illinois Technology and Research Corridor ○ North Shore (Chicago) ○ Northwest Indiana

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State of Indiana

Indianapolis (capital)

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- Elkhart
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- Fort Wayne
- Gary
- Goshen
- Greenwood
- Hammond
- Indianapolis
- Jeffersonville
- Kokomo
- Lafayette
- Lawrence
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- Mishawaka
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- Terre Haute
- Valparaiso
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Largest towns	○ Avon ○ Brownsburg ○ Clarksville ○ Highland ○ Merrillville ○ Munster ○ Plainfield ○ Saint John ○ Schererville ○ Zionsville

Counties	○ Adams ○ Allen ○ Bartholomew ○ Benton ○ Blackford ○ Boone ○ Brown ○ Carroll ○ Cass ○ Clark ○ Clay ○ Clinton ○ Crawford ○ Daviess ○ Dearborn ○ Decatur ○ DeKalb ○ Delaware ○ Dubois ○ Elkhart ○ Fayette ○ Floyd ○ Fountain ○ Franklin ○ Fulton ○ Gibson ○ Grant ○ Greene ○ Hamilton ○ Hancock ○ Harrison ○ Hendricks ○ Henry ○ Howard ○ Huntington ○ Jackson ○ Jasper ○ Jay ○ Jefferson ○ Jennings ○ Johnson ○ Knox ○ Kosciusko ○ LaGrange ○ Lake ○ LaPorte ○ Lawrence ○ Madison ○ Marion

Regions	○ Central Indiana
	  ○ East Central Indiana
	  ○ Wabash Valley
	○ Northern Indiana
	  ○ Northwest Indiana
	  ○ Chicago metropolitan area
	  ○ Michiana
	○ Southern Indiana
	  ○ Indiana Uplands
	  ○ Kentuckiana
	  ○ Southwestern Indiana

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National	○ United States ○ Israel
Geographic	○ MusicBrainz area
Other	○ NARA

About Keypad

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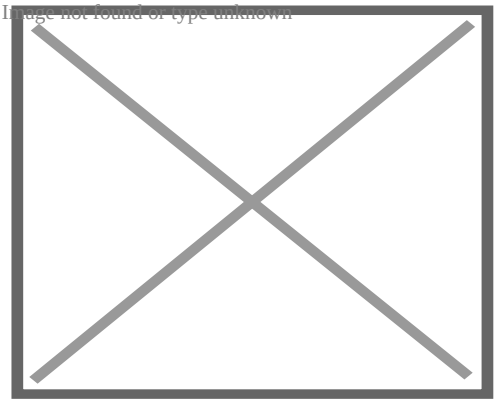

A telephone keypad using the ITU E.161 standard.

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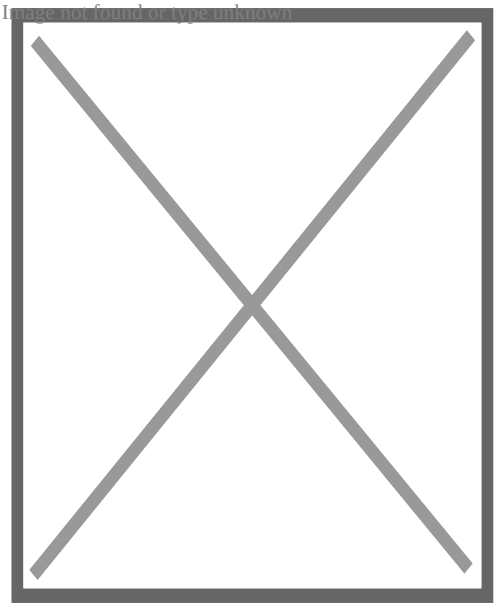

Numeric keypad, integrated with a computer keyboard

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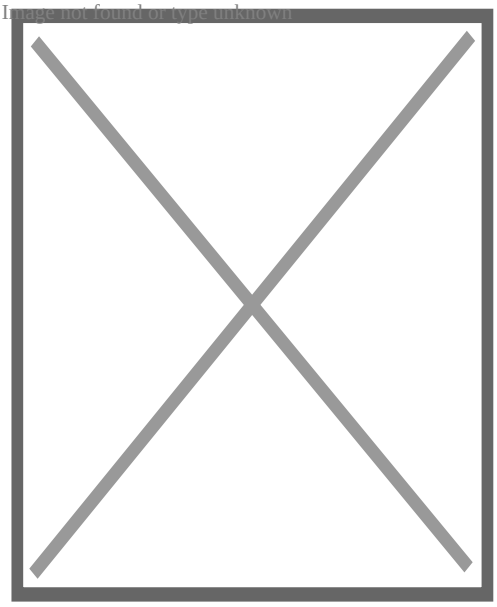

A calculator

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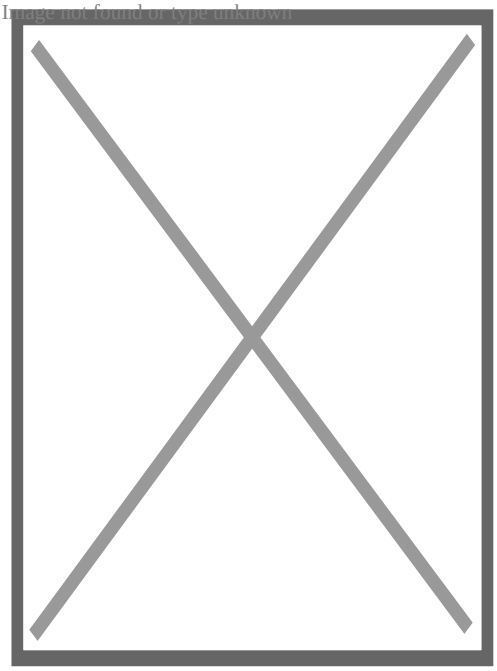

1984 flier for projected capacitance keypad

A **keypad** is a block or pad of buttons set with an arrangement of digits, symbols, or alphabetical letters. Pads mostly containing numbers and used with computers are numeric keypads. Keypads are found on devices which require mainly numeric input such as calculators, television remotes, push-button telephones, vending machines, ATMs, point of sale terminals, combination locks, safes, and digital door locks. Many devices follow the E.161 standard for their arrangement.

Uses and functions

[edit]

A computer keyboard usually has a small numeric keypad on the side, in addition to the other number keys on the top, but with a calculator-style arrangement of buttons that allow more efficient entry of numerical data. This number pad (commonly abbreviated to *numpad*) is usually positioned on the right side of the keyboard because most people are right-handed.

Many laptop computers have special function keys that turn part of the alphabetical keyboard into a numerical keypad as there is insufficient space to allow a separate keypad to be built into the laptop's chassis. Separate external plug-in keypads can be purchased.

Keypads for the entry of PINs and for product selection appear on many devices including ATMs, vending machines, point of sale payment devices, time clocks, combination locks and digital door locks.

Keypad technologies

[edit]

Apart from mechanical keypads,[1][2][3] there are a wide range of technologies that can be used as keypads, each with distinctive advantages and disadvantages. These include Resistive,[4] Capacitive,[5] Inductive,[6] Piezoelectric,[7] and Optical.[8]

Key layout

[edit]
Further information: Telephone keypad § Layout

The first key-activated mechanical calculators and many cash registers used "parallel" keys with one column of 0 to 9 for each position the machine could use. A smaller, 10-key input first started on the Standard Adding Machine in 1901.[9] The calculator had the digit keys arranged in one row, with zero on the left, and 9 on the right. The modern four-row arrangement debuted with the Sundstrand Adding Machine in 1911.[10]

There is no standard for the layout of the four arithmetic operations, the decimal point, equal sign or other more advanced mathematical functions on the keypad of a calculator.

The invention of the push-button telephone keypad is attributed to John E. Karlin, an industrial psychologist at Bell Labs in Murray Hill, New Jersey.[11][12] On a telephone keypad, the numbers 1 through 9 are arranged from left to right, top to bottom with 0 in a row below 789 and in the center. Telephone keypads also have the special buttons labelled * (star) and # (octothorpe, number sign, "pound", "hex" or "hash") on either side of the zero key. The keys on a telephone may also bear letters which have had several auxiliary uses, such as remembering area codes or whole telephone numbers.

The layout of calculators and telephone number pads diverged because they developed at around the same time. The phone layout was determined to be fastest by Bell Labs testing for that application, and at the time it controlled all the publicly connected telephones in the United States.

Origin of the order difference

[edit]

Although calculator keypads pre-date telephone keypads by nearly thirty years, the top-to-bottom order for telephones was the result of research studies conducted by a Bell Labs Human Factors group led by John Karlin. They tested a variety of layouts including a Facit like the two-row arrangement, buttons in a circle, buttons in an arc, and rows of three buttons.[11] The definitive study was published in 1960: "Human Factor Engineering Studies of the Design and Use of Pushbutton Telephone Sets" by R. L. Deininger.[13][14] This study concluded that the adopted layout was best, and that the calculator layout was about 3% slower than the adopted telephone keypad.

Despite the conclusions obtained in the study, there are several popular theories and folk histories explaining the inverse order of telephone and calculator keypads.

- One popular theory suggests that the reason is similar to that given for the QWERTY layout, the unfamiliar ordering slowed users to accommodate the slow switches of the late 1950s and early 1960s.[15]
- Another explanation proposed is that at the time of the introduction of the telephone keypad, telephone numbers in the United States were commonly given out using alphabetical characters for the first two digits. Thus 555-1234 would be given out as KL5-1234. These alpha sequences were mapped to words. "27" was given out as "CRestview", "28" as "ATwood", etc. By placing the "1" key in the upper left, the alphabet was arranged in the normal left-to-right descending order for English characters. Additionally, on a rotary telephone, the "1" hole was at the top, albeit at the top right.

Keypad track design

[edit]

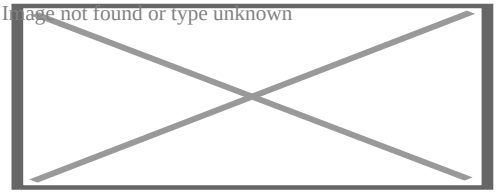

Figure 1. Keypad wiring methods: separate connections (left), x/y multiplexing (center), Charlieplexing (right).

Separate connections

[edit]

A mechanically-switched 16-key keypad can be connected to a host through 16 separate connecting leads, plus a ground lead (Figure 1, left). Pressing a key will short to ground, which is detected by the host. This design allows any number or combination of keys can be pressed simultaneously. Parallel-in serial-out shift registers may be used to save I/O pins.

X/Y multiplexing

[edit]
See also: Keyboard matrix circuit

These 16 + 1 leads can be reduced to just 8 by using x/y multiplexing (Figure 1, center). A 16-key keypad uses a 4 × 4 array of 4 I/O lines as outputs and 4 as inputs. A circuit is completed between an output and an input when a key is pressed. Each individual keypress creates a unique signal for the host. If required, and if the processor allows, two keys can be pressed at the same time without ambiguity. Adding diodes in series with each key prevents key ghosting, allowing multiple simultaneous presses.

Charlieplexing

[edit]
Main article: Charlieplexing

8 leads can detect many more keys if tri-state multiplexing (Figure 1, right) is used instead, which enables (n-1) × (n/2) keys to be detected with just n I/O lines. 8 I/O can detect 28 individual keys without ambiguity. Issues can occur with some combinations if two keys are pressed simultaneously. If diodes are used, then the number of unique keys detectable is doubled.[16]

See also

[edit]

- Arrow keys
- Charlieplexing
- Digital door lock
- Keyboard (computing)
- Keyboard matrix circuit
- Keyboard technology
- Key rollover
- Mobile phone
- Numeric keypad
- Push-button telephone
- Rotary dial
- Silicone rubber keypad
- Telephone keypad

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External links

[edit]

Look up ***keypad*** in Wiktionary, the free dictionary.

- Interfacing Matrix Keypad to 8051 Controller

About Lake County

Driving Directions in Lake County

Driving Directions From 41.366510327857, -87.3408646 to

Driving Directions From 41.408057240601, -87.343798613815 to

Driving Directions From 41.391735468419, -87.318200587644 to

Driving Directions From 41.428981281465, -87.421575428085 to

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Driving Directions From 41.382799094677, -87.347560275608 to

Driving Directions From 41.450223110903, -87.428508635102 to

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